REMARKS

Applicant respectfully requests reconsideration of the Final Office Action dated July 28, 2005. Claims 1 - 6 are pending in this application and have been rejected.

DMD Technology

First, DMD is an assembly consisting of micro mirror elements and each mirror element rotates between the positions of respective reflections of ON-light and OFF-light. Generally, such rotation angle positions and rotation angle ranges are predetermined.

Second, a luminous flux diameter of ON-light emitted toward a projection lens system is predetermined (however, tilting angles of DMD elements (substrate) with respect to a direction of emission of ON-light can be changed.

Taking into consideration the first and second premises mentioned above, when an F number of an illumination optical system (which corresponds to a diameter of luminous flux incident on DMD) is changed, an angle of illumination light incident on a polarization separating surface, and accordingly an angle θ between the incident direction of light incident on DMD and the emitting direction (the first direction) of ON-light emitted from DMD is changed. When a luminous flux diameter of ON-light is D, a

luminous flux diameter of incident light is Dcosθ.

That is to say, according to F number of illumination light system, an angle θ between the direction of an incident light incident on DMD and an emitting direction of ON-light emitted from DMD would be set.

According to the polarization separating prism of the invention, even when an illumination light incidents on a polarization separating surface of an angle smaller than the critical angle, the illumination light can be incident on DMD, and accordingly freedom for designing a device may be increased. Please refer to the paragraph [0039] of the specification.

The Office Action

In the outstanding Office Action, the Examiner initially quotes Applicant's amended claim 1 as follows "wherein an angle between the light which is incident on the digital micro mirror device from the illumination optical system and the illumination light modulated by the digital micro mirror device and emitted in the first direction is set according to an F number of the illumination optical system" (see Office Action page 3, lines 2 -5 up from the bottom). The Examiner then goes on to argue that it is inherent that O'Connor would make the DMD emit light in the first direction according to an F number sighting Sato '903.

Initially, it is respectfully requested that the Examiner refer to O'Connor who shows light entering SLMs (spatial light

modulators). As shown in Figure 2, there is an SLM 36, SLM 50, and SLM 34. Light enters and exits each SLM perpendicular as shown. Since it is perpendicular, it enters and exits at the same place and there is no angle set according to an F number. In the initial portion of the specification it is disclosed that the SLM devices may be either digital mirror devices (DMVs), grating light valves (GLDs) or liquid crystal displays (LCDs). '722 in its description makes no distinguishing reason for using one or the other. There is no recognition in '722 of the affect of an angle which is incident on a digital mirror device (DMD) from the illumination optical system in its relationship to the illumination light modulated by the digital micro mirrored device, and no suggestion that there is any relationship between the two which would require setting according to an F number of the illumination optical system as claimed.

In O'Connor, the angle θ (angle between the incident direction and emitting direction) is clearly 0°. Since it is 0°, cos θ = 1. Then the term Dcosθ would be D x 1 or D. The diameter of the luminous flux in O'Connor is not dependent upon the angle θ at all (see DMD Technology discussion above).

The Examiner lacks any such teaching in O'Connor '722. Light enters and exits perpendicular and all three types of light modulators are interchangeable. The Examiner then asserts that O'Connor would inherently incorporate the claimed relationship quoted by the Examiner. The Examiner points to United States

Patent 202/0033903 to Sato, which the Examiner argues teaches in paragraph 12 - 14 that the incidence angle on a light modulator is set or at least limited by a F number of the illumination optical system. Sato however is not a device, which utilizes a DMD. Sato instead is a device, which utilizes only LCD technology and does not in anyway suggest that DMD technology is present. A computerized search of '903 shows that the term DMD or digital micro mirror is not present.

In the portion relied upon by the Examiner, namely paragraphs 12 - 14 '903 reviews the standard F number calculation in paragraph [0012]. This reference explains that the aperture cannot be made smaller than the aperture of the multi-lens arrays 42 and 43. The F number in Sato is related to the aperture, not the incidence of light on the digital micro mirror device from the illumination optical system and the illumination light modulated by the micro mirror device which Applicant requires must be set according to the F number of the illumination optical system.

In Sato, as explained in paragraph [0014], the lower limit of the F number in which contrast can be prevented from being lower is 2. The focal length f of the condenser lens 44 is required as shown to be f equal 50x2 = 100mm.

Sato shows the relationship between the focal length described in paragraphs [0012 - 0014] best in Figure 9, which shows the 100mm focal length of lens 44, which focuses on the LCD 51.

The Examiners assertion of inherency residing in O'Connor '722 is respectfully traversed. O'Connor as can clearly be seen from every figure shows light entering and exiting the SLM's perpendicular. In contrast, Applicant's claim 1 requires that the angle between the light incident on the DMD and the illumination light modulated by the DMD be set according to an F number of the illumination optical system. Nothing of the sort occurs in O'Connor '722 because it is simply perpendicular feeding light in to and out of the polarization beam splitters such as PBS 32 (Figure 2).

As can be seen in Applicant's Figure 1, light striking the surface 51 enters DMD 70, and is then reflected from DMD 70 in a manner which is not along the same path as is entered. The light is reflected from 70 back towards 80 and passes through the surface 51 because of the change in polarization direction by quarter wave plate 60. The angle shown of the light reflecting off of surface 51 and returning back to surface 51 in Applicant's Figure 1 is the angle claimed. There is no angle that would respond to this suggested by the references of record, and it is certainly not inherent in the references as the Examiner would assert.

In view of the foregoing, it is respectfully submitted that the application is now in condition for allowance, and early action in accordance thereof is requested. In the event there is

any reason why the application cannot be allowed in this current condition, it is respectfully requested that the Examiner contact the undersigned at the number listed below to resolve any problems by Interview or Examiner's Amendment.

Respectfully submitted,

Ronald R. Snider
Reg. No. 24,962

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Snider & Associates
Ronald R. Snider
P.O. Box 27613
Washington, D.C. 20038-7613
(202) 347-2600

RRS/bam